PART NUMBER DATA SHEET

# EB13K4H2H-32.768K TR

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Ecliptek

## REGULATORY COMPLIANCE (Data Sheet downloaded on Dec 1, 2017)

Lead Free COMPLIANT | EU RoHS 2011/65 + 2015/863 COMPLIANT | China RoHS COMPLIANT | REACH 174 SVHC COMPLIANT

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Regulatory Compliance standards are subject to updates by governing bodies. Click the badges to download the latest compliance docs for this part number directly from Ecliptek.

DRC CONFLICT FREE

## ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 3.3Vdc 4 Pad 2.5mm x 3.2mm Ceramic Surface Mount (SMD) 32.768KHz ±50ppm over -40°C to +85°C

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Nominal Frequency** | 32.768KHz |
| **Frequency Tolerance/Stability** | ±50ppm over -40°C to +85°C (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, Shock, and Vibration) |
| **Aging at 25°C** | ±5ppm/year Maximum |
| **Supply Voltage** | 3.3Vdc ±10% |
| **Input Current** | 1mA Maximum |
| **Output Voltage Logic High (Voh)** | 90% of Vdd Minimum (IOH= -4mA) |
| **Output Voltage Logic Low (Vol)** | 10% of Vdd Maximum (IOL= +4mA) |
| **Rise/Fall Time** | 20nSec Maximum (Measured at 20% to 80% of waveform) |
| **Duty Cycle** | 50 ±5(%) (Measured at 50% of waveform) |
| **Load Drive Capability** | 15pF Maximum |
| **Output Logic Type** | CMOS |
| **Logic Control / Additional Output** | Tri-State |
| **Tri-State Input Voltage (Vih and Vil)** | 90% of Vdd Minimum or No Connect to Enable Output, 10% of Vdd Maximum to Disable Output (High Impedance) |
| **Standby Current** | 10µA Maximum (Disabled Output: High Impedance) |
| **Start Up Time** | 10mSec Maximum |
| **Storage Temperature Range** | -55°C to +125°C |

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **ESD Susceptibility** | MIL-STD-883, Method 3015, Class 1, HBM: 1500V |
| **Fine Leak Test** | MIL-STD-883, Method 1014, Condition A |
| **Flammability** | UL94-V0 |
| **Gross Leak Test** | MIL-STD-883, Method 1014, Condition C |
| **Mechanical Shock** | MIL-STD-883, Method 2002, Condition B |
| **Moisture Resistance** | MIL-STD-883, Method 1004 |
| **Moisture Sensitivity** | J-STD-020, MSL 1 |
| **Resistance to Soldering Heat** | MIL-STD-202, Method 210, Condition K |
| **Resistance to Solvents** | MIL-STD-202, Method 215 |
| **Solderability** | MIL-STD-883, Method 2003 |
| **Temperature Cycling** | MIL-STD-883, Method 1010, Condition B |
| **Vibration** | MIL-STD-883, Method 2007, Condition A |



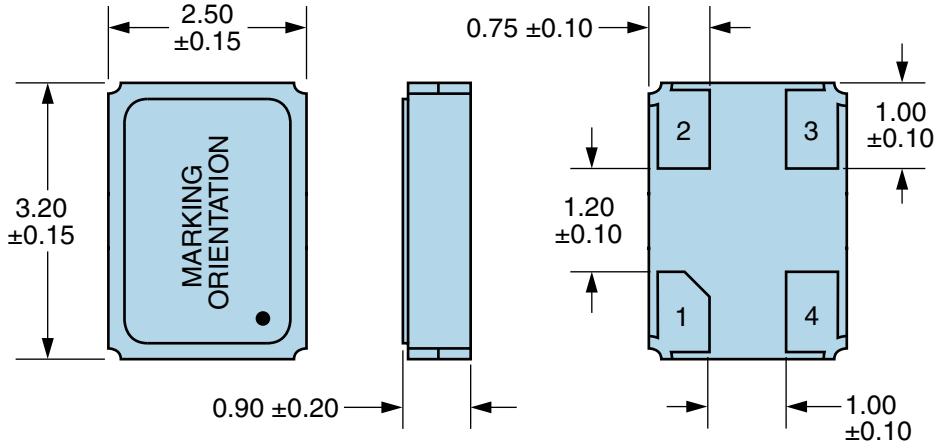
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## MECHANICAL DIMENSIONS (all dimensions in millimeters)

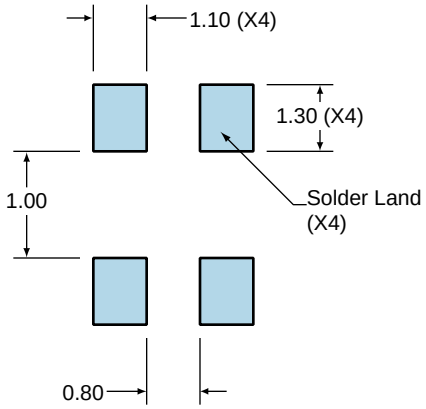



| PIN | CONNECTION |
|---|---|
| 1 | Tri-State |
| 2 | Case/Ground |
| 3 | Output |
| 4 | Supply Voltage |

| LINE | MARKING |
|---|---|
| 1 | **E32.7**<br>*E=Ecliptek Designator* |
| 2 | **XXXXX**<br>*XXXXX=Ecliptek Manufacturing Identifier* |

## Suggested Solder Pad Layout

All Dimensions in Millimeters




All Tolerances are ±0.1



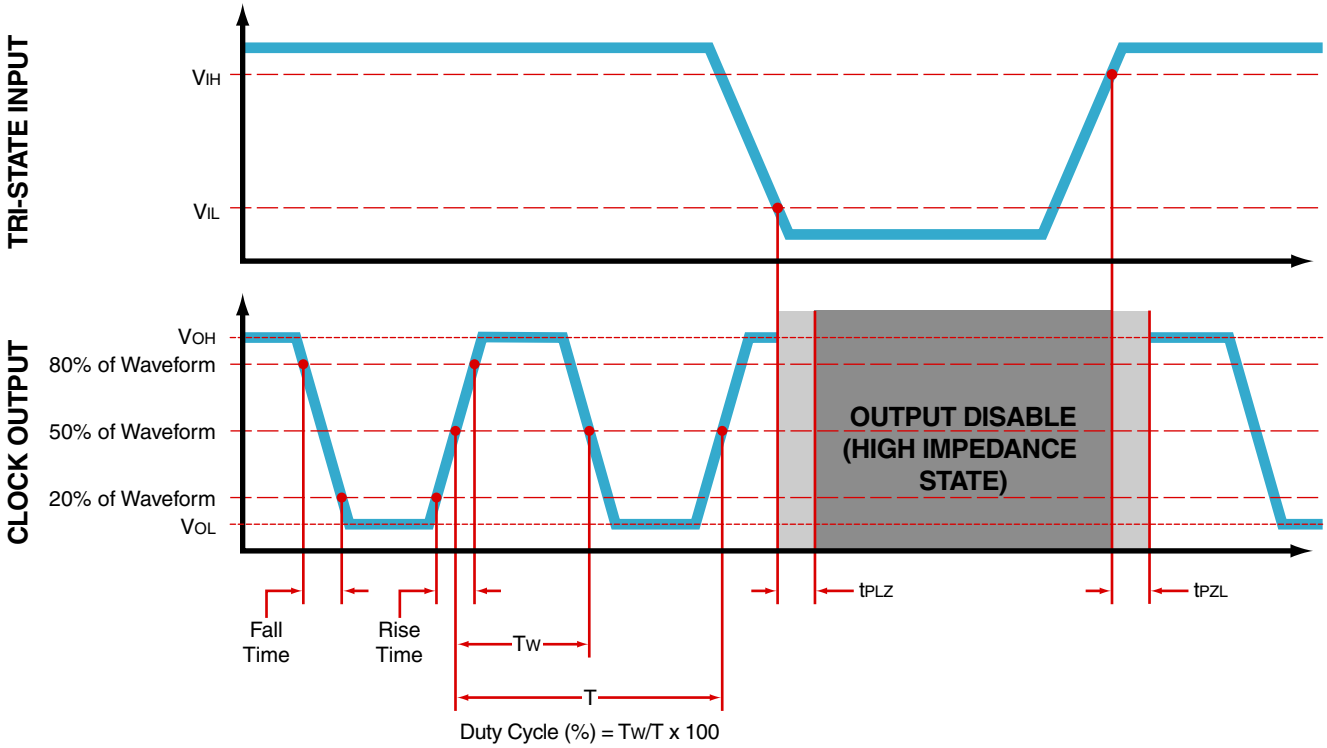
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## OUTPUT WAVEFORM & TIMING DIAGRAM





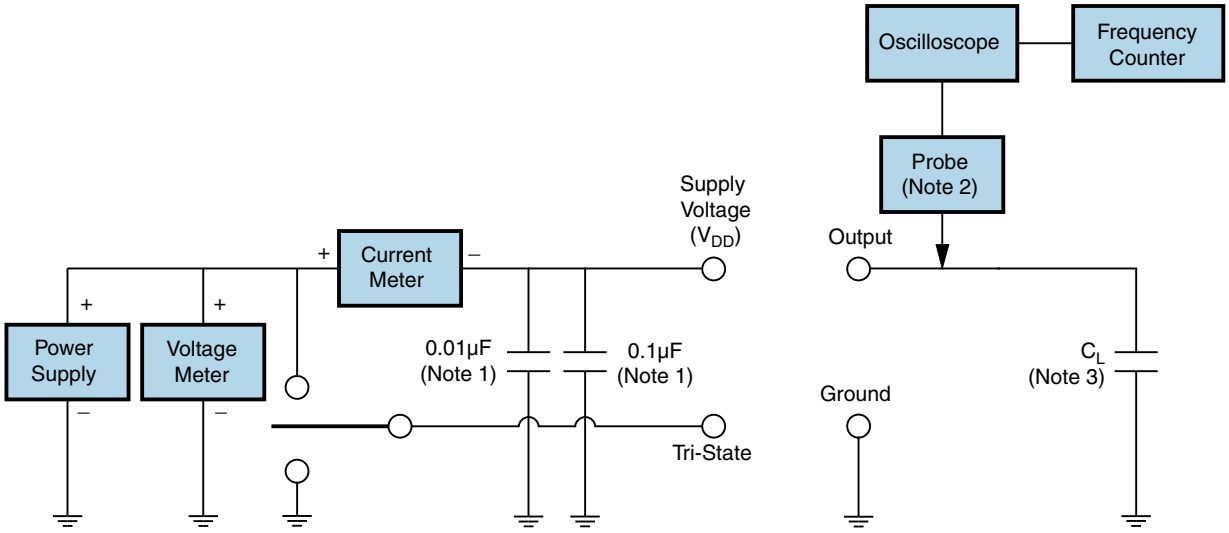

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## Test Circuit for CMOS Output




Note 1: An external 0.01µF ceramic bypass capacitor in parallel with a 0.1µF high frequency ceramic bypass capacitor close (less than 2mm) to the package ground and supply voltage pin is required.
Note 2: A low capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>300MHz) passive probe is recommended.
Note 3: Capacitance value $C_L$ includes sum of all probe and fixture capacitance.



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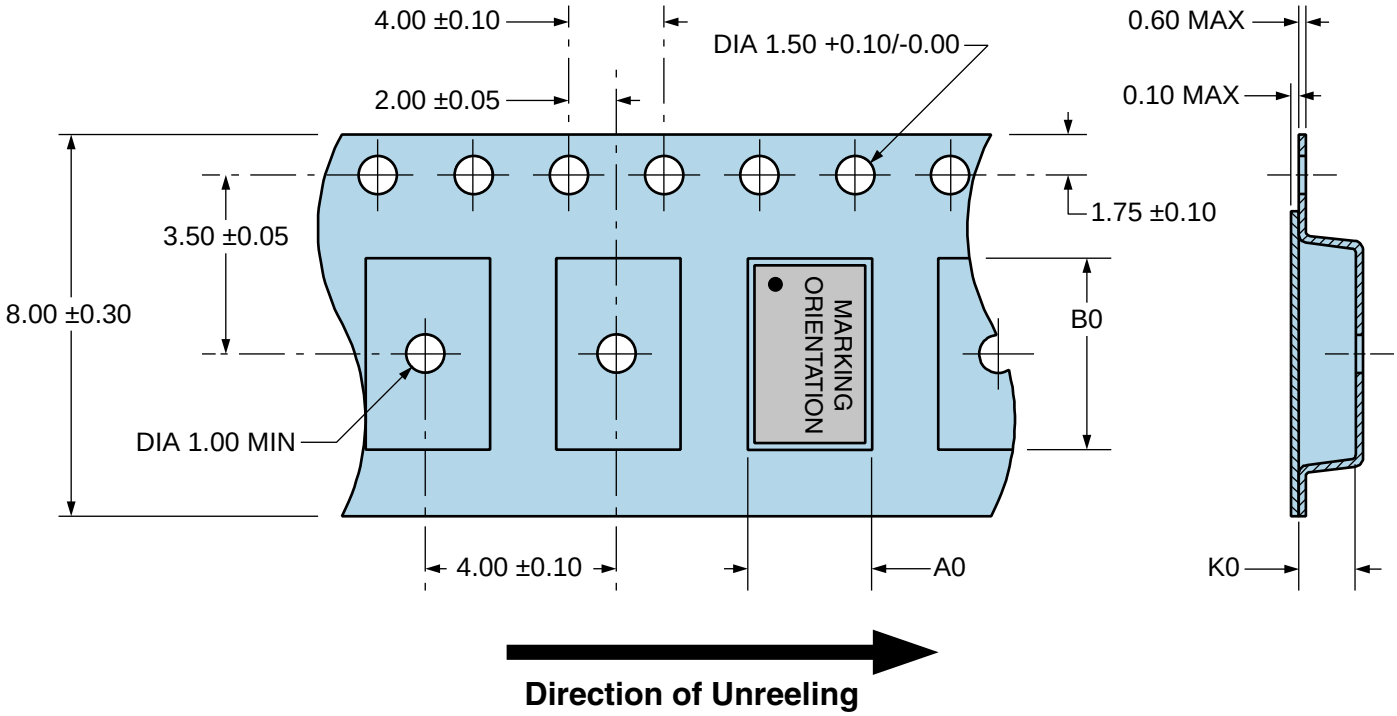
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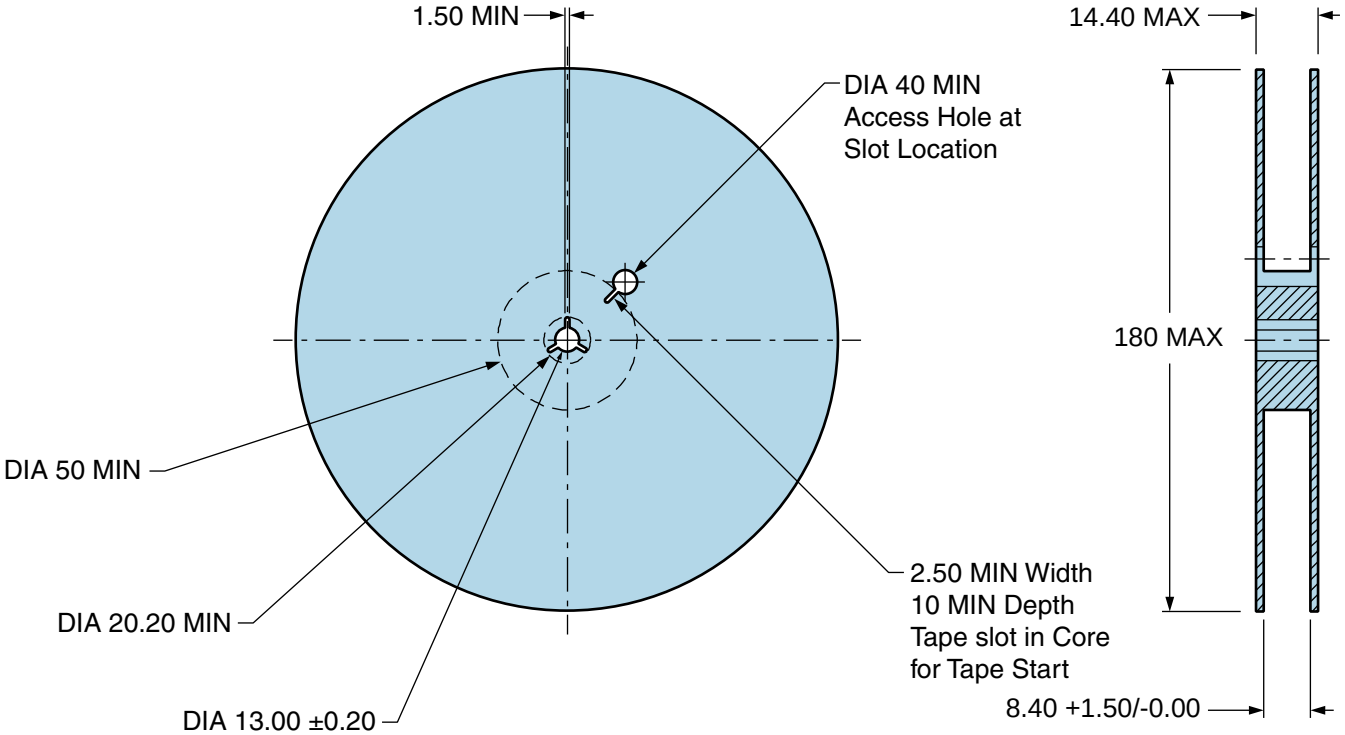
## Tape & Reel Dimensions

Quantity Per Reel: 1,000 units

All Dimensions in Millimeters

Compliant to EIA-481



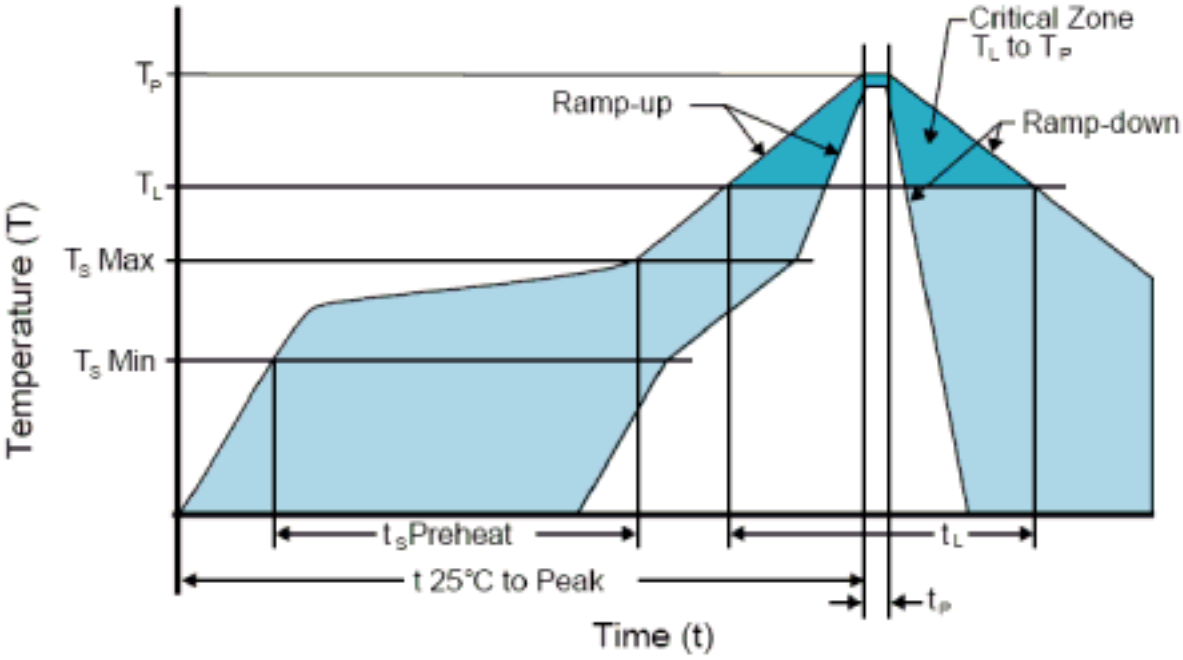



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## Recommended Solder Reflow Methods




## High Temperature Infrared/Convection

| | |
|---|---|
| **$T_S$ MAX to $T_L$ (Ramp-up Rate)** | 3°C/Second Maximum |
| **Preheat** | |
| **- Temperature Minimum ($T_S$ MIN)** | 150°C |
| **- Temperature Typical ($T_S$ TYP)** | 175°C |
| **- Temperature Maximum ($T_S$ MAX)** | 200°C |
| **- Time ($t_S$ MIN)** | 60 - 180 Seconds |
| **Ramp-up Rate ($T_L$ to $T_P$)** | 3°C/Second Maximum |
| **Time Maintained Above:** | |
| **- Temperature ($T_L$)** | 217°C |
| **- Time ($t_L$)** | 60 - 150 Seconds |
| **Peak Temperature ($T_P$)** | 260°C Maximum for 10 Seconds Maximum |
| **Target Peak Temperature ($T_P$ Target)** | 250°C +0/-5°C |
| **Time within 5°C of actual peak ($t_p$)** | 20 - 40 Seconds |
| **Ramp-down Rate** | 6°C/Second Maximum |
| **Time 25°C to Peak Temperature (t)** | 8 Minutes Maximum |
| **Moisture Sensitivity Level** | Level 1 |



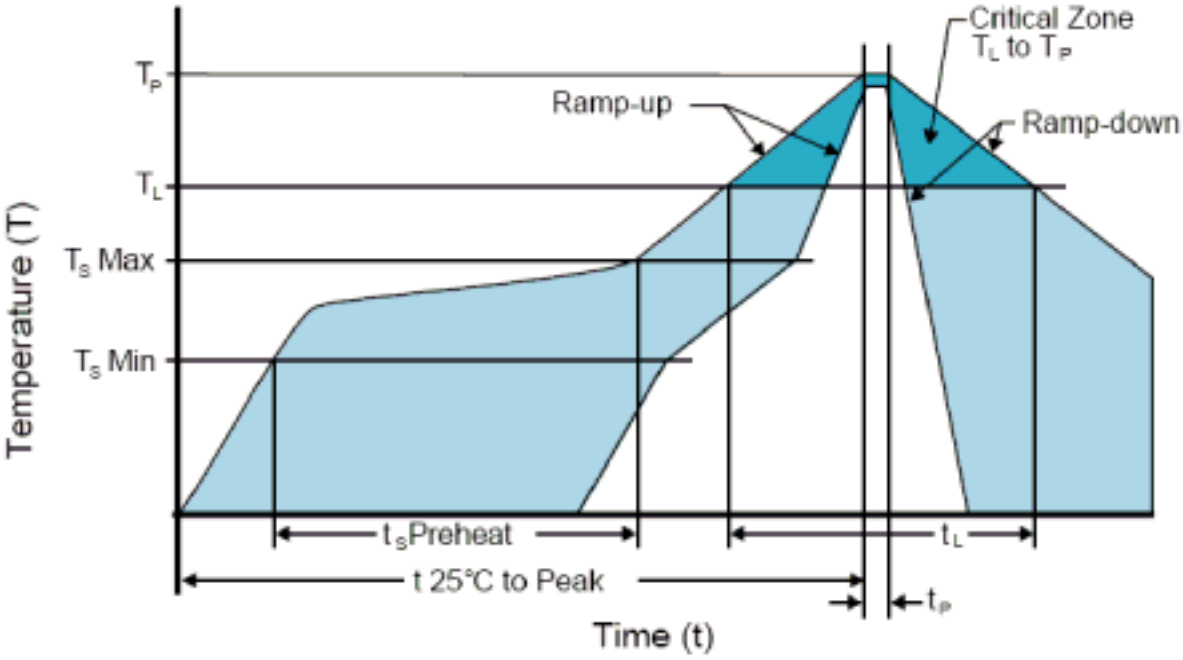
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## Recommended Solder Reflow Methods




## Low Temperature Infrared/Convection 240°C

| | |
|---|---|
| **$T_S$ MAX to $T_L$ (Ramp-up Rate)** | 5°C/Second Maximum |
| **Preheat** | |
| **- Temperature Minimum ($T_S$ MIN)** | N/A |
| **- Temperature Typical ($T_S$ TYP)** | 150°C |
| **- Temperature Maximum ($T_S$ MAX)** | N/A |
| **- Time ($t_S$ MIN)** | 60 - 120 Seconds |
| **Ramp-up Rate ($T_L$ to $T_P$)** | 5°C/Second Maximum |
| **Time Maintained Above:** | |
| **- Temperature ($T_L$)** | 150°C |
| **- Time ($t_L$)** | 200 Seconds Maximum |
| **Peak Temperature ($T_P$)** | 240°C Maximum |
| **Target Peak Temperature ($T_P$ Target)** | 240°C Maximum 2 Times / 230°C Maximum 1 Time |
| **Time within 5°C of actual peak ($t_p$)** | 10 Seconds Maximum 2 Times / 80 Seconds Maximum 1 Time |
| **Ramp-down Rate** | 5°C/Second Maximum |
| **Time 25°C to Peak Temperature (t)** | N/A |
| **Moisture Sensitivity Level** | Level 1 |

## Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum.

## High Temperature Manual Soldering

260°C Maximum for 5 Seconds Maximum, 2 times Maximum.



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